

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Verification and In-Flight Experimentation (6)

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OVERVIEW OF THE ORION PAD ABORT 1 LAUNCH ABORT SYSTEM

Abstract

The Orion Pad Abort 1 (PA-1) Flight Test was conducted on May 6th, 2010 at White Sands Missile Range (WSMR) in New Mexico as a key step towards validating the Orion crew exploration vehicle's (CEV) launch abort system (LAS). The LAS is an integral part of NASA's ongoing development activities to enable safer space vehicles for future manned spacecraft. As the title of the flight test implies – the PA-1 test was a demonstration of the capability of the LAS to perform an abort from the launch pad and carry the Orion crew module (CM) to a safe altitude and down range distance such that the CM parachutes can be deployed, allowing the CM to land safely in the waters off the Kennedy Space Center launch complex. The LAS is comprised of three solid propellant rocket motors: an abort motor (AM), an attitude control motor (ACM), and a jettison motor (JM). These motors are integrated into the LAS stack through several structural interface elements. The LAS, in the PA-1 configuration, is then attached to the CM through a structural adapter cone and 6 retention and release (RR) attachments. The proposed oral presentation will provide an overview of the development of the Orion LAS in preparation for the PA-1 flight test. A brief discussion of previously and currently fielded launch abort systems will be presented, as will some of the fundamental design drivers for the Orion LAS. The overall capabilities of the LAS system and a discussion of its key component systems and an assessment of their performance during the flight test will be discussed. Selected key technology advancements as evidenced through building block motor development tests will be highlighted. The proposed oral presentation is intended to be complementary to an overview presentation of the PA-1 flight test that is also being submitted to session D2.6.